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MICROPALAEONTOLOGY AND STRATIGRAPHY OF DURAL EAST NO. I BORE SYDNEY AREA, NEW SOUTH WALES.

by

Irene Crespin.

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INTRODUCTION

Dural East No. 1 Bore is situated 16 miles north-north-west of Sydney. It was drilled with a percussion plant by Australian Oil and Gas Corporation Limited.

A continuous suite of cuttings, taken between the depths of 40 feet and 4,905 feet in this bore, was submitted for micropalaeontological examination. Many samples were taken at intervals of 10 feet and others at irregular intervals. Little contamination was noted in the cuttings.

The bore passed through beds of Triassic and Permian ages, the last sample received at 4,905 feet being most probably in the Permian. It is understood that dolerite was penetrated below this depth.

No fossils were found in the majority of samples but tests of radiolaria were found in the Permian beds between 3,181 feet and 3,291 feet and Permian foraminifera between 4,105 feet and 4,805 feet and in one sample at 4,793-4,805 feet.

DETAILED DESCRIPTION OF SAMPLES

40-790 feet	: Ochreous to grey micaceous sandstone.
790-865 feet	: Grey carbonaceous micaceous sandstone and whitish sandstone.
865-950 feet	: Dark grey sandstone and white sandstone.
1040-1050 feet	: Chiefly fragments of red micaceous siltstone.
1050-1345 feet	: Fine grey and dark grey micaceous silty sandstone and white sandstone.
1345-1350 feet	: Coarse white to grey sandstone.
1350-1943 feet	: Grey sandstone and fine grained micaceous sandstone.
1943-2000 feet	: Quartz sandstone with fragments of red micaceous siltstone.
2000-2048 feet	: Grey to greenish grey and red siltstone.
2048-2727 feet	: Grey shale and grey sandstone.
2727-2733 feet	: Sandstone with coal fragments.
2743-2830 feet	: Coarse sandstone with fragments of coal.
2838-2844 feet	: Coal.
2944-3181 feet	: Coal with fragments of coarse sandstone and grey shale.

3181-3202 feet : Sandstone with tests of radiolaria (Cenosphaera sp., cf. Porodiscus).

3202-3247 feet : Sandstone and carbonaceous siltstone.

3247-3285 feet : Fragments of coal.

3285-3295 feet : Carbonaceous shale with tests of radiolaria (Cenosphaera sp.)

3295-4081 feet : Carbonaceous shale with fragments of coal.

4081-4134 feet : Carbonaceous shale with fragmentary foraminifera (Dentalina sp.)

4134-4393 feet : Carbonaceous shale with foraminifera moderately common.

Frondicularia parri Crespin
Frondicularia sp.
Hyperammina sp.
Nodosaria sp.

4393-4513 feet : Hard dark grey calcareous shale with a few foraminifera.

Frondicularia parri Crespin
Hyperammina sp.

4513-4595 feet : Dark grey carbonaceous shale with foraminifera and ostracoda.

Foraminifera: Ammodiscus multicinctus Crespin and Parr
Frondicularia parri Crespin
Frondicularia woodwardi Howchin
Geinitzina triangularis Chapman and Howchin.
Hyperammina sp.
Thurammina sp.

Ostracoda: Cavellina aequivalvis Crespin
Cavellina cf. kulnuraensis Crespin.

4594-4665 feet : Carbonaceous shale and calcareous sandstone.

4665-4700 feet : Calcareous, carbonaceous shale, carbonaceous sandstone and large fragments of coal.

4700-4793 feet : Calcareous carbonaceous shale.

4793-4805 feet : Carbonaceous shale with foraminifera (Hyperammina sp.)

4805-4905 feet : Carbonaceous shale and calcareous micaceous sandstone.

NOTES ON THE SAMPLES

From evidence based on the micro-examination of the cuttings from Dural East No. 1 Bore, the probable stratigraphical equivalents of the strata penetrated in the bore section are as follows:

		Hawkesbury Sandstone 40-865 feet
Triassic	Narrabeen Group	(Undifferentiated) 865-2727 feet
	* Newcastle Coal Measures	2727-4081 feet
	ø Maitland Group	4081-4665 feet
	? Greta Coal Measures	4665-4700 feet
	x ? Dalwood Group	4700-4905 feet

Although there appeared to be little contamination in the cuttings it is nevertheless difficult to indicate precise boundaries between lithological units on the evidence from cuttings.

The bore commenced in beds of the Triassic Hawkesbury Sandstone and geologists of Australian Oil and Gas Corporation suggest that it passed into the underlying Triassic Narrabeen Group at 865 feet. Fragments of the characteristic red and green beds of the Narrabeen Group were noticeable in the cuttings between the depths of 1040 feet and 2048 feet and it is suggested that beds referable to this Group were present from 865 feet down to 2727 feet.

The first appearance of coal fragments was in sample at 2727-2733 feet and it is suggested that the break between the upper coal deposits of the Permian and the overlying Narrabeen Group is somewhere about this depth. Coal was common in many samples between 2727 feet and 4081 feet, which probably represents the thickness of the Newcastle Coal Measures of the area. However, apparently some marine incursions took place at different times because siliceous bodies representing radiolaria were found in samples at 3181-3189 feet, 3196-3202 feet and 3285-3295 feet.

At 4081 feet coal fragments disappeared and marine beds of Permian age were penetrated, probably persisting down to 4665 feet. Foraminifera were first met with at 4134-4141 feet when a fragment of Dentalina was found. Foraminifera and ostracoda were present in many samples between this depth and 4595 feet.

Unfossiliferous beds consisting of carbonaceous shale and calcareous sandstone were present down to 4700 feet, with bands of coal between 4665 feet and 4700 feet, with These bands of coal are tentatively places in the Greta Coal Measures.

From 4700 feet down to the last sample received at 4905 feet, the sediments consist of calcareous shale and calcareous micaceous sandstone, with a bed at 4793 feet-4805 feet containing a fragment of the foraminifera Hyperammina. There is a possibility that the bore may have penetrated beds equivalent of the Dalwood Group of the Hunter River area.

It is understood that the bore passed into dolerite at a depth below 4905 feet.

The foraminiferal assemblage between 4134 feet and 4595 feet consists of Ammodiscus multicinctus, Frondicularia parri, F. woodwardi, Geinitzina triangularis, and Hyperammina sp. The ostracoda include Cavellina aequivalvis and

* Formerly known as "Upper Coal Measures"
ø Formerly known as "Upper Marine Series"
x Formerly known as "Lower Marine Series"

C. cf. kulnuraensis which were described by Crespin (1945a) from the Kulnura Bore, 32 miles to the north-east of Dural East No. 1 Bore. The preservation of both the foraminifera and ostracoda in the Dural Bore is similar to that in the Kulnura Bore; all are stained black to brown.

The foraminiferal assemblage is dominated by the species Frondicularia parri described from the Kulnura Bore (Crespin, 1945). In that bore, F. parri was found between the depths of 4020 feet and 4260 feet, being very common at 4123 feet. In the Dural Bore the species is well represented at 4523-4532 feet and 4532-4540 feet.

F. parri has not yet been found in surface deposits in any part of the Hunter River area but it has been noted in some subsurface sections where it is associated with numerous tests and species of other foraminifera. In the Kulnura Bore and Dural East No. 1 Bore, both of which are in the Sydney area, the associated species are few and are similar. The unique occurrence of this species with its restricted stratigraphical range in the Kulnura Bore led the writer to her final report on that bore (1938) to suggest that the beds containing this small assemblage of foraminifera and ostracoda would most probably not appear in deposits to the north of Kulnura area but were likely to be well developed in a southerly direction. The present bore, 32 miles south-west of Kulnura, supports this suggestion. It is also fairly certain that had samples been closely studied from the Balmain Bore, Sydney area, the same association would have been found. Only fragmentary foraminifera (Hyperammina sp.) and ostracoda (Healdia sp.) were recorded from beds regarded as equivalent of the "Upper Marine Series" (now Maitland Group), (Raggatt and Crespin, 1941).

Because of the lack of detailed work on the fauna of the Permian deposits in the Sydney area, the exact stratigraphical position in the Permian sequence of the beds containing F. parri is uncertain, but it is considered that they may be equivalent of part of the Maitland Group, probably the Branxton Subgroup of the Hunter River area, at least in part. Furthermore, no detailed study has been made of the deposits in the Western Coalfields for foraminifera, other than the Victoria Pass section, Mitchell Highway, in which all species belong to the group of arenaceous foraminifera.

The following comparison of the Permian sequence in the Dural East No. 1 Bore and the Kulnura Bore may be of interest. The sequence in the latter is based on that shown by Raggatt and Crespin (1940); the stratigraphical nomenclature has been revised.

Stratigraphical Equivalents	Kulnura Bore	Dural East No. 1 Bore
Newcastle Coal Measures	2700-3775 feet	2727-4081 feet
Maitland Group Upper foraminiferal zone with F. parri	3775-4490 feet	4081-4665 feet
Greta Coal Measures	4490-4667 feet	4665-4700 feet
Dalwood Group	4667-6293 feet	4700-4905 feet

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